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Cost-Keeping Systems

Mechanical Engineering

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COST-KEEPING SYSTEMS

BY

Ralph Kent Hursh

THESIS FOR THE DEGREE OF BACHELOR OF SCIENCE
IN MECHANICAL ENGINEERING

IN THE
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ENTITLED COST-KEEPING SYSTEMS

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

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Instructor in Charge.

APPROVED: L. P. Breckenridge

HEAD OF DEPARTMENT OF Mechanical Engineering

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COST KEEPING SYSTEMS.

GENERAL OUTLINE:-

- I INTRODUCTION.
    - (A) Organization and Routine.
    - (B) Cost Keeping; Its Nature and Object.
        - (1) What Constitutes Cost of Production.
            - (a) Material Costs.
            - (b) Labor Costs.
            - (c) Methods of Paying Labor.
            - (d) Factory Burden.
            - (e) Commercial Costs.
        - (2) Aids to Cost Keeping.
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        - (1) Examples from Practice.
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- II EXAMPLES FROM PRACTICE.
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    - (3) System Used by Moline Automobile Co.
- III PROPOSED SYSTEM.
    - To determine Cost of Instruction in Shop Practice at the University of Illinois.

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I. INTRODUCTION.

As manufacture has developed, competition has arisen and more attention has been given to the cost of production. Every effort is being made to cheapen processes, save labor and material and to reduce, in every possible way, the cash outlay for a given product. Cheaper methods of production have been advised, labor-saving machinery has been introduced, industries have been consolidated, all with the object of decreasing production costs.

(A) ORGANIZATION AND ROUTINE.

Decreased costs can only come thru increased factory efficiency and this is dependent upon a thoroly established system. As the labor-hour efficiency is increased, so will the productive efficiency increase, approaching more and more nearly a maximum as the organization becomes more thoro and the administration becomes more nearly automatic in its action. The operation of the factory must be reduced to a routine. As it approaches this condition the amount of waste in time and effort decreases, the factory efficiency increases and we have a more economical producer.

In a well-organized factory every operation and every act of a worker is ordered and regulated thru system and an established routine. The duties of each element in the organization must be distinct in order that friction may be reduced and regularity secured. Charts of organization and division of authority are frequently used and aid materially in the ad-

ministration of the concern.

(B) COST-KEEPING; ITS NATURE AND OBJECT.

Closely allied to the organization of a factory is its system of accounting, the object of which is to determine, more or less closely, the actual cash-outlay required for the production of a given article. Not only is the total expenditure determined but the cost of each process and operation involved. The cost records thus obtained furnish a basis upon which to estimate the amount and cost of future production. Close study of detailed cost records is frequently the means of determining possible economies by labor reduction. Thus cost keeping furnishes both a guide to future production and a means of locating excessive expenditures in manufacture.

The details and operation of these systems vary for different products and manufacturing conditions but the principles involved and the object of their use remain the same thruout. Not only are labor and material used on a given article to be determined for its cost but it must also bear its share of Factory Burden or fixed charges and this includes all items of operating expense not included in productive labor and material.

(1) WHAT CONSTITUTES COST OF PRODUCTION. Manufacturing costs are divided into two general classes, Operative or Production Costs and Commercial or Selling Expenses. The first occur in the factory itself and are applied directly to the product, the latter are connected with the offices and the Sales Department. The accompanying chart of "Elements Entering into Cost of Production" shows what items go to make up these two

general classes of expense.

Production Costs are of greatest interest to engineers and are made up of the Labor and Material Costs and what is called Accruing Manufacturing Expense or Factory Burden. These are the actual costs in the shop and are the ones which really determine Selling Prices and the ones to which we look for possible savings.

(a) Material Expense is made up of the cost of all raw material, as furnished to the factory, which goes directly into the product. Finished parts, bought ready for assembling are included in this but such stock as is used in the manufacture but does not enter the product is included in some item of Factory Charges. Jigs, tools and special appliances are thus accounted for.

(b) Labor costs are the wages of productive labor as applied directly to the article manufactured. These are often the determining factors in the cost of production since all manufacture depends, more or less, on the labor. To the time of the workman, then, we look closest for possible economics. Reduction of labor in an operation means a lessening of the cost and hence special machinery is introduced.

(c) The payment of laborers is an important feature in the factory. There are several systems in use, i.e., Day work, Piece Work, Premium Work and a later type known as the Differential Piece Rate System.

The day-wage system is the simplest and most generally used but has defects which have led to the introduction of the

- COST OF PRODUCTION.
  - PRODUCTION COSTS.
    - A. Material
    - B. Labor (productive)
      - Time Work
      - Premium Work
      - Piece Work.
    - C. Accruing Manufacturing Expense.
      - Salaries.
        - Portion of Executive Salaries and Expense.
        - Superintendents and Foremen.
        - Draftsmen
        - Time and Cost Department.
        - Purchasing Department
        - Stores Department.
      - Non-Productive Labor.
        - Tool Making and Repairing
        - Tool Boys (messengers).
        - Pattern Makers.
        - Millwrights.
        - Inspectors
        - Carpenters
        - Painters. (where not directly applied)
        - Engineers and Firemen.
        - Porters.
        - Truckers.
        - Elevator Men.
        - Packers.
      - Rent.
      - Taxes.
      - Insurance.
      - Water, Light and Fuel.
      - Pattern Material.
      - Packing Material.
      - Patent Costs.
      - Law Costs.
      - Strike Defence and Association Costs.
      - Experimental Work.
      - Incoming Freight, Express and Drayage.
      - Factory Supplies.
      - Factor of Safety, Leakage, etc.
      - Miscellaneous Manufacturing Expense.
      - Interest.
        - On Investment.
        - On Borrowed Money.
      - Maintenance.
        - Factory Buildings.
        - Power Plant
        - Electric Plant.
        - Shafting, Hangers and Belting.
        - Machine Tools.
        - Small Tools.
        - Jigs and Templates.
        - Shop Furniture and Fixtures.
        - Patterns.
        - Miscellaneous Shop Equipment.
      - Depreciation.
        - Machine Tools.
        - Small Tools.
        - Patterns.
        - Jigs and Templates.
        - Factory Buildings.
        - Power Plant
          - Engines.
          - Generators.
          - Boilers.
        - Electric Plant.
        - Shafting, Hangers and Belting.
        - Electric Equipment.
        - Shop Furniture and Fixtures.
        - Air System.
          - Compressors.
          - Pipes and Fittings.
        - General Equipment Not Specified.
  - COMMERCIAL COSTS
    - Salaries.
      - Executive Officers.
      - Salesmen and Advertising Managers.
      - Bookkeepers and Clerks.
      - Stenographers.
      - Janitors.
      - Shipping Department.
    - Office
      - Rent.
      - Light and Heat.
      - Supplies and Stationery.
    - Advertising
      - Supplies and Stationery.
      - Postage.
      - In Periodicals.
    - Travelling Costs.
    - Entertainment.
    - Telegraph and Telephone.
    - Allowances, Bad Debts, Collection Costs.
    - Depreciation
      - Office Building.
      - Furniture and Fixtures.

ELEMENTS ENTERING INTO COST OF PRODUCTION.
From Chart by F. E. Webner.

other methods. There is no standard upon which to base a day's work and the amount done varies greatly according to the skill and willingness of the workman. Some employees will intentionally waste much of their time or will do the work carelessly. An unskillful man will lose a great deal in ineffective effort. Strict supervision in the shop will correct both of these difficulties to some extent but, at best, the system is loose and there is no definite basis of work from which to determine the cost of an operation.

In the Piece Work system a fixed wage per peice is established on the basis of past work and the workman is paid according to the amount done. While this makes exact estimates of cost possible there are practical difficulties in the method. Thru desire for a large wage the laborer is liable to carelessness and over haste and poor work is the result. The time comes, too, when the acquired skill of the workman makes the amount done much greater and the wage becomes too high in proportion to the effort. Rate-cutting follows with consequent dissatisfaction and henceforth the man will work only fast enough to earn a maximum wage and with a further reduction. The double penalty for too little work and for fully applied effort defeats the object of the system.

To avoid this trouble the premium system was devised. A time limit, fixed by past production under favorable conditions, is set on a piece of work on a day-pay basis. If the work is done in less than schedule time the gain is divided, according to an agreed percentage, between the employer and the work-

man. A reward for increased effort is thus established without the additional penalty of rate cutting. The system lacks, however, a penalty for too little effort since the day-wage system applies up to the specified limit. This method has been adopted in many shops and is fairly satisfactory.

The Differential Price Rate System is probably not as well known as the others and has not come into extensive use. It has many advantages from the theoretical standpoint but some difficulties may be met in practive. In this system a low piece rate is established for work up to a certain amount beyond which the price per piece is raised both on the excess and the specified amount. Thus the rate per piece varies with the number finished. The slow workman receives only a low wage while the more skillful one is rewarded for his greater effort. Poor workmanship thru carelessness and under haste is penalized by not raising the rate.

To establish a proper base rate for this system requires a careful estimate of the time required and an average cost. Care must be used to make the price sufficiently low and still allow workman to make a reasonable wage. To do this the work should be carefully timed when performed under favorable conditions allowing for every detail of the operation.

(d) All expenses in the factory, not included in labor and material charges, are classed under Fixed Charges or Burden. These cannot be charged directly to any part of product but are disposed of by dividing them as equitably as possible over the total. The cost items which go to make up this general class

of expense are shown on the chart under Accruing Manufacturing Expense. In simple accounting allowance is made for Burden charges by merely adding a certain percentage of the labor and material cost to fix the total shop cost. This may be done either for the factory as a whole or in the separate departments. Burden charges may also be made on a Productive Hour basis. A certain rate per hour is charged in each department and this item is then proportional to the time required for the manufacture of an article.

Different methods are used in allowing for some of the elements of Factory Burden, than that of a fixed charge in proportion to the total time spent on labor and material cost of an article.

Drafting room expenses may be, in a large part, charged directly to the product. For special orders drawings may be charged in the same manner as material. For articles that are to be duplicated, the total charge for drawings may be divided over the estimated number to be manufactured. The plans are thus considered as assets of the firm and are paying for their cost.

Under the head of non-productive labor are some items that may be partially disposed of as a direct charge to the product. While tool-making and repairs on jigs, dies, templates, etc. are generally charged to the factory account, special tools and appliances should be considered as part of the cost of the article for the manufacture of which they are made. Patterns, dies, jigs etc. are generally considered as working factors whose cost is divided over the product on which they are used by such

as are used on a single order must be charged directly to it. Wages of pattern makers and packers may be handled in the same way as those of draftsmen and the expenses of these departments thus paid partly by direct charge.

Power plant costs, including the fixed charges, wage and fuel items may also be considered separately from the Burden charge. In this method the cost of power is determined as in an individual plant and is charged to the factory as a separate concern. The power charge may be included as such in the factory Burden or it may be charged to the machines using it as an element of their working expense.

In such a system the machines are credited with a certain rate of hourly wage which covers all expenses of their operation and is charged to the product in the same manner as productive labor. To determine the amount of this hourly wage the cost of the machine and its life or time in use is first considered. To pay for itself it must earn the amount of its first cost and interest on the investment. In addition to this its wage rate must include its power and maintenance charges and floor space rental.

For exmaple, a machine costing $1000.00 has an estimated life of 10 years at the end of which time it will be worth 10% of its first cost. This net cost is then $900.00 and to cover this it must earn $90.00 per year. The interest on the investment for the first year will be 5% of $1000.00 or $50.00 Suppose its power charge is $20.00 per H.P. per year and its average consumption is 5H.P. Its power cost will then be $100.00

Add to this $20.00 for other expenses, maintenance and rental and its total earnings must be $260.00. Its time of overation is 2000 hours and its hourly wage is then 13 cents. During the second year it pays interest on only $910.00 having earned $90.00 of its cost. The total earnings will then be $90.00 $45.50 $100.00 $20.00 = $255.50 and its wage will be 12.8 cents per hour.

In this way the machine pays for itself by its work, its wage being charged directly to the product upon which the work is applied. More equitable distribution of this item of expense is thus made than by the old percentage charge for the whole equipment. The idle machines are, of course, a dead load on the factory and their interest must be added to the Burden charge.

(e) Commercial Expenses may be treated in two ways. As is usually done, they may be considered as a factor in the Production cost. They are then charged to the product just as the expenses of any department of the factory. A percentage charge may be made on each article in the same manner as Factory Burden or some items may be charged directly to the article on the sale of which they were applied.

Another method in use is to consider the Sales Department as an individual commercial concern. The product is turned over by the factory at a price equal to the shop production cost. It is then marketed by the Salesmen its selling price being equal to the cost price to the sales department plus its share of de-

partmental expense plus a percentage for profit. This is the simple and probably a better method of accounting as it keeps the shop costs which are the real production costs and which are the basis of all estimates distinct from the fluctuating commercial costs. Knowledge of the manufacturing costs are essential and of value. The Commercial Costs are incidental and vary for every article sold.

(2) AIDS TO COST KEEPING. To determine and to record the various elements of manufacturing expense cost keeping systems have been devised and intorduced. They are a guide and a controller of production thru the routine that they establish. The operation of such systems requires the use of various blanks or printed forms. In some of the more elaborate systems a great number of these are used. Usually an effort has been made to reduce the number of printed forms to save confusion. Combinations of complicated nature have been designed but sooner or later the cost-keeper finds that there is a limit to useful combination of cost details. A number of simpler forms can be used to greater advantage than a less number of complicated ones. Thus there has been a simplification of details and a multiplication of production steps.

The form and number of the blanks used vary in different systems. Some use a set of books in which every transaction and the production details are recorded but such systems are cumbersome and can be used only in small concerns. Loose leaf ledgers have replaced these and are used very extensively. Card forms are very convenient for some details and may be used en-

tirely but a combination of the card forms and looseleaf recordds is now used in the best systems and is recognized as the most convenient and effective method of obtaining detailed costs.

(b) OBJECT OF THIS DISCUSSION.

(1) The present discussion has two objects in view. The first of these is a discussion of the principles and some details of cost keeping systems now in use presenting therewith examples of some of the forms or blanks used. The information presented has, as far as possible, been obtained from the firms using these systems the remainder being from standard references on the subject.

(2) The second part of the discussion is devoted to a proposed system of cost-keeping for the Mecahnical Engineering Department Shops of the University of Illinois, the object of the system being to determine the cost of instruction in shop practice. The system presented is not an elaborate one and will use few forms, simplicity and ease of operation being desired.

II. EXAMPLES FROM PRACTICE.

(1) STRIEBY AND FOOTE SYSTEM.

The first system to be considered is taken as an exmaple of a simple method of cost determination for a special line of manufacture. The information is taken from the discussion of the system of Strieby and Foote of Newark, N. J. manufacturers of drop forgings, as presented in Arnold's Complete Cost Keeper.

The basis of the system is a collective production order card authorized by the General Manager and issued by the Superintendent. Upon it is recorded the items of production cost, material, coal and labor and the machine wage. Upon acceptance of the work by the inspector the card is returned to the office for filing. Order cards are indexed and filed according to the character of the piece for all standard forgings.

On this system the commercial costs are separated from the manufacturing costs. Production orders are issued by the office on the factory and the finished work is turned over to a department of Finished Stores from which orders are filled by requisition of the Sales department. The order is then recorded on the shipping book and a record of the sale made in an ordinary set of books in the office.

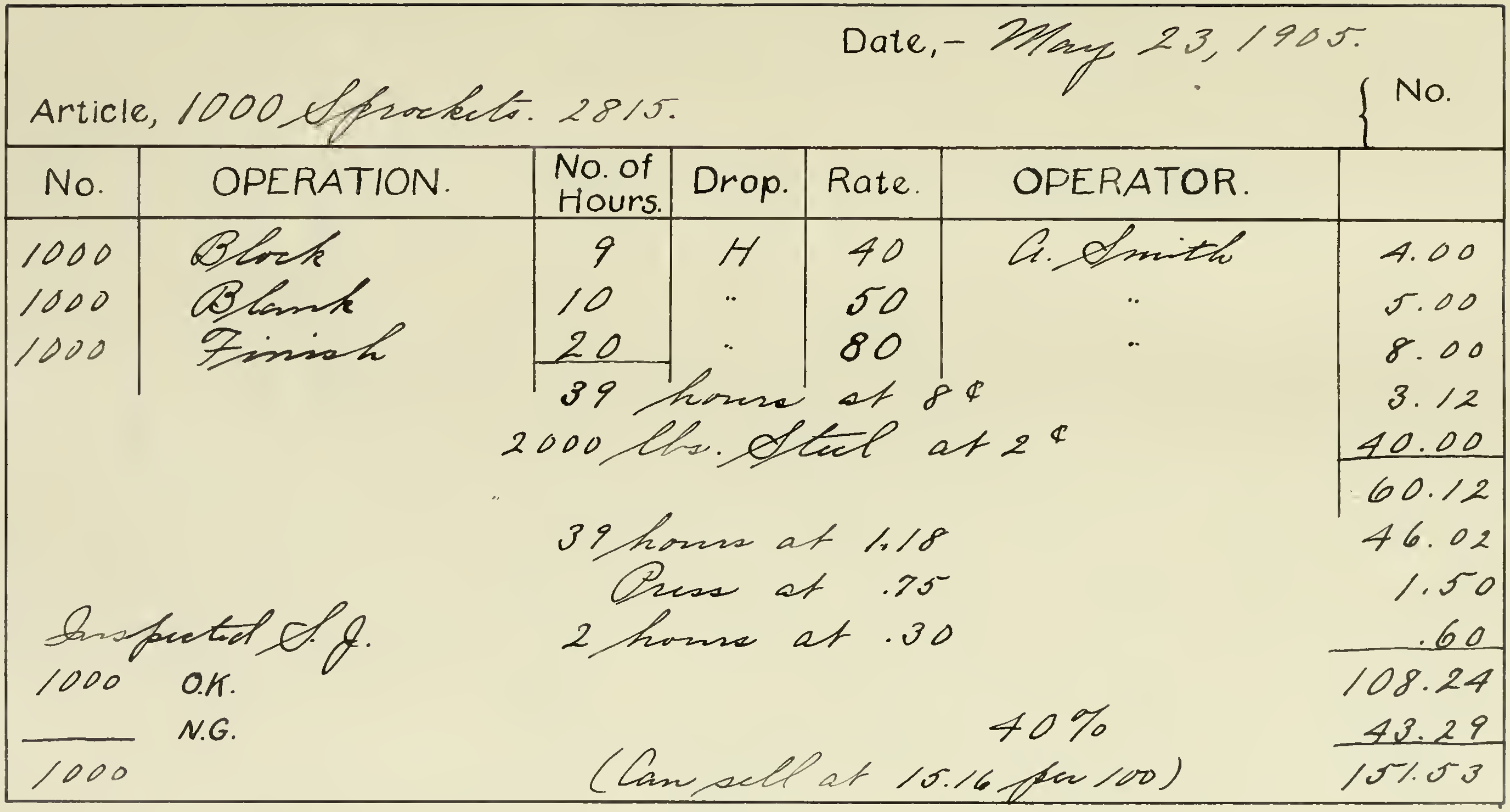
The costs of production are divided into four classes, (1) Office or Commercial Expenses, (2) Factory Charges, including all expenses in the factory except productive labor, (3) Manufacturing Account, made up of wages of labor applied direct-

ly to the product, and (4) the Die Room Account which is made up of all the expenses of that department.

The total factory expense is the sum of the Factory Charges and the Die Room Account. It is divided among the productive tools in the form of an hourly wage on a basis of their cost. In case one tool has an excessive maintenance charge, however, its rate is increased and a reduction is made for some other tool whose operating expenses are less. Not only is this expense charged to working tools but the time of idleness of any machine is considered as so much loss to the factory and its expense must be paid out of the profits on the work of other machines.

The production order used by Strieby and Foote is shown in figure 1, page 14. These blanks are made up in pads and are numbered consecutively. All the production costs are entered upon these cards and they become a complete cost record for the orders they cover. These orders are issued only by the Superintendent upon request from the office. The number of pieces to be made is not filled in when the card is issued but a pencil memorandum is made which is sent with the order card to the stock-room. Upon delivery of the required material in the shop this is filled out. In case there is not enough stock on hand for the whole order, a request for purchase of material is sent to the purchasing agent and the remainder of the number is finished on a supplimentary production order when the material arrives.

Upon completion of the work on an order the finished



Date,- May 23, 1905.

Article, 1000 Sprockets. 2815. { No.

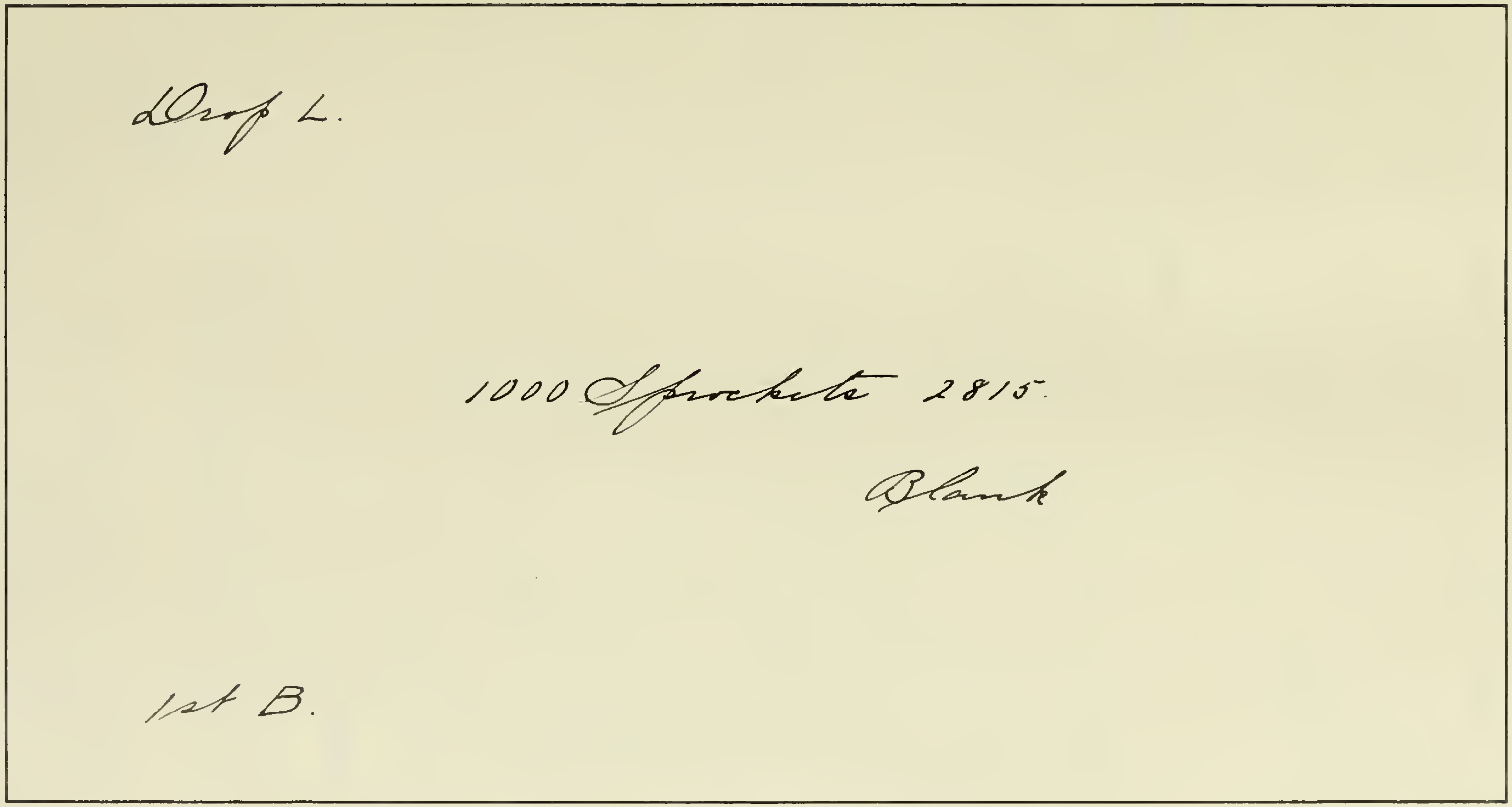
No.	OPERATION.	No. of Hours.	Drop.	Rate.	OPERATOR.	
1000	Block	9	H	40	A. Smith	4.00
1000	Blank	10	..	50	..	5.00
1000	Finish	20	..	80	..	8.00
		39 hours at 8¢				3.12
		2000 lbs. Steel at 2¢				40.00
						60.12
		39 hours at 1.18				46.02
		Press at .75				1.50
	Inspected S. J.	2 hours at .30				.60
1000	O.K.					108.24
	N.G.				40%	43.29
1000		(Can sell at 15.16 per 100)				151.53

Production Order. Fig. 1.
Strieby and Foote.

product and the order card are sent to the inspector who O.K.'s the card and sends it to the Cost-Keeper, the product going on to the Finished Stores Department. The finished order cards are kept on file by the Cost-Keeper for reference.

Sub-production orders are made out for each operation on blanks as shown in figure 2. The first of these is made out in duplicate, one being sent to the stores-keeper who cuts off the stock and delivers it with the order to the foreman of the hammer room. The receipt of the stock and order for the first operation constitute an order upon the foreman to finish the work without further detail orders. The duplicate of this sub-order is filed in the rack of machine tool work cards in the Superintendent's office to show what work is before machine B. Similar orders for the other operations are placed in these racks as a record of the work before them.

Two record books are kept in the office of the Superintendent, the first being a Rough Stores Memorandum and the second an Index Book. In the first is kept a record of all stock deliveries and disbursements in credit and debit columns respectively. A page is kept for each size of stock used and a balance should show the amount on hand. The Index Book contains one line records of all orders and these are grouped according to the article represented as Sprockets, Cranks, etc. An additional alphabetical index is also kept to cover special articles. The book is made with a cut margin index, its size being 6 inches wide by 13 inches high.



Drop L.

1000 Sprockets 2815.

Blank

1st B.

Sub-Production Order. FIG. 2.

STRIEBY AND FOOTE.

By this simple system a comparison of costs on similar items can readily be made. The finished order cards are a permanent record, easy of access, for all past production. While the system is not adapted to many forms of manufacture it is effective and easily operated in such a concern as the one in which it is used.

(2) DEERE & CO. SYSTEM.

There are two classes of cost-finding, one in which costs are determined for each separate machine or article manufactured and the other where costs are determined per hundred articles. Of the latter class is the system of Struby and Foote, just described, and of many manufacturers of standard products where a large number of like parts are made. This method is especially applicable in the manufacture of farm machinery and is used by such concerns as the International Harvester Co. plants and Deere & Co. of Moline, Illinois, manufacturers of plows. It was impossible to obtain sample forms from this concern as they do not favor publicity in the matter of their cost system but a brief outline of their methods will be presented.

The system begins with the ledger where the factory is first divided into departments. The product is then divided into standing orders which cover all the labor and material costs in each department.

The detailed costs are kept by a separate section of the cost department. They are determined on the basis of labor and material costs per one hundred machines. A specification sheet is made out for each complete machine. On it is recorded

the brand, dates in and out of use, a description of each separate part and the number required. In addition to this there are columns for the labor and material costs and the total cost of each part.

The labor cost is determined on a basis of the total amount of piece work on each part. Records of this item are kept for each piece in a card file, the cards being indexed numericallb. These labor costs are revised yearly to allow for changes in methods and design of parts.

As all labor is not done by piece work the itemizing of costs is simplified by reducing the wage expense to a piece work basis. This is done by means of a factor determined in the following manner. The total amount of piece work wage for t the year is subtracted from the total labor expense and the difference of these two divided by the total piece work wage, is added to 100% to get the desired factor. The wage cost on any part is then multiplied by this factor to obtain the actual labor cost of that part.

Material cost is determined by the weight of the part considered and cost per pound of the raw material used.

By the addition of total costs on each part the production cost per one-hundred complete machines is determined. This is the basis of estimates on future costs. In case the estimated costs for any year exceed the catual ledger account the balance is termed as excess. If they prove to be lower than ledger costs the surplus expense is considered as wastage.

This method of cost finding and estimating on future production is especially adapted to such a line of manufacture where the product methods of manufacture are so nearly uniform from year to year. The extensive use of automatic machine toolls, jigs, dies, etc., makes the rate of production nearly constant and the division of manufacturing expense over the total number of machines produced is sufficiently accurate while in many other lines of manufacture where fewer standard parts are made, such a method would not be allowable.

(3) SYSTEM OF MOLINE AUTOMOBILE CO.

The Moline Automobile Co., of East Moline, Illinois, has kindly furnished samplesof the various forms used in their cost-keeping system which are here included. This is a plant manufacturing a standard product of four different models. The machines are turned out in lots as in this way a number of like parts can be made on one order and expenses of production thus reduced.

The factory is divided into six production departments, (A) Machine Shop, (B) Paint Shop, (C) Wood Shop, (D) Trimming Department, (E) Assembling Department, and (G) Testing Department. About 75 to 100 men are employed and the average out put for the season is   machines.

Production orders are issued by the Superintendent on Form R9, Shop order, A copy of this is sent to each department thru which the work is to pass, one to the cost keeping department, where the order is entered on the cost records under its shop order number, and one is retained as a record in the order files of the Superintendent.

Upon receipt of the Shop Order, the foreman of the department in which the first operation is performed issues a requisition for material, Form R-7, which is presented to the store keeper. Upon delivery of the stock the requisition is receipted by the foreman and a record of the disbursement is then entered in the stock record.

Stock room supplies are ordered by the Purchasing agent upon request of the Superintendent on Form A-4. The order

for material is made out in triplicate on the form shown on p. The original goes to the purchasee, the duplicate to the files of the purchasing department and the triplicate to the Superintendent. The figures at the top of the office copy are an index to dates for follow-up orders.

Upon receipt of material a report is made out by the store-keeper on Form A-5 and a tissue copy of this is retained by him for posting the Stock Record, Form A-6. This book is practically a ledger for stock accounts and may be balanced from time to time to show the value of material on hand.

Labor costs are obtained from the daily time cards which are made up in different colors for the various departments. The pay roll sheet is shown in Form A-10 and the voucher for the employee's wages in Form R-26.

A record of each employee is made on Form A-13 at the time of his application and contains such information as may be desired for reference.

A cost record is kept for each shop order on Form A-11. On the one side of this sheet is kept a detailed record or labor and material charges in various departments, these being taken from the daily time cards and stock requisitions respectively. On the reverse side is a summary of departmental costs, labor and material costs, and a percentage charge for non-productive labor and supplies appearing in the first column, the Burden or General expense item in the second and the Total Shop Cost or Production Cost in the third column.

All shipments are itemized on Form A-29 and the total sales and costs for the month are thus found and transferred to their proper accounts.

The remaining forms need no detailed explanation. They are such as are used in the general book-keeping of the firm and in the sales and shipping departments.

This system is not a complicated one. The forms are good and the operation of the system is fairly simple. It is inclusive and effective, and the costs are determined accurately enough for all purposes.

Factory Burden is covered by a straight percentage charge on the porduct and includes the ordinary expenses outside of labor, material and supplies. Non-productive labor and material not entering the product is a separate charge in each department. Probably a percentage charge is made for depreciation of buildings and equipment and is thus included in Department Cost.

With so few idle machines and a standard product it is hardly necessary to establish a machine wage nor to reduce the shop charges to a production hour basis.

Some minor changes might be made to advantage in this system. An entry on the requisition for material could be made which would specify the place of delivery. Stock would then be delivered at the machine where it was to be used and extra transfer would thus be avoided.

In connection with this the planning of work for each machine might be mentioned. In large plants this is done by the Planning Department but in a small factory it may be done by the foreman. The object is to keep a day's work ahead of each

machine and to have all material at hand ready for use. Much time may thus be saved in changing jobs.

The method is to number the machine tools and to keep separate files of some sort for the shop orders or work cards of the jobs to be done. This would be kept at the foreman's desk and could be easily referred to for any job in the department.

An example of this system of planning is that used by the Link Belt Co., in their Chicago plant. In this system a Work Card and Duplicate of the form shown on p. 63 and p.64 are used. In the office of the Planning Department are a set of books numbered according to the machine tools. On these are placed the work cards and duplicates for each job planned for the respective machines in the order in which the jobs are to be performed. These cards arepplaced on the hook as soon as the material has beendelivered at the machine.

At the offices of the foreman are boards with sets of hooks, a series of eight for each machine, on which are placed duplicates of the cards on the office hooks. These are arranged in the same order as the cards in the office.

In starting a job the workman is given the first card on the hook which is stamped with the time of issue by the clerk. The duplicate remains on the hook to show the operation in progress.

Upon completion of the job the workamn turns his card in at the office and the time is again stamped on it. The work card is then turned over to the cost department and the dupli-

cate notifies the posting clerk that the material is ready for the next operation.

By this system a ready reference is afforded for all work going on in the shop and the foremen know just what is planned for every machine in their departments.

The work card referred to forms also a detailed cost card and contains all information connected with that item of the order. The time is stamped at the top as shown. The sheet number, refers to the Bill of Material and the Mark to the item. A description of the piece and the number in the order is given. In the lower left hand corner of the large space are symbols of the operations required and the machines upon which they are performed. The number, 311, indicates the first operation which is drilling, and 3DR indicates the machine. Another card is used for the second operation which is inspection of the work done in department 2. Other items need no explanation.

On the back of this card are spaces for information regarding the wages on a premium or a differential piece rate basis and instructions relative to the tool and machining of the part. This is not usually filled in at the time the card is issued but cards at the machines give instruction for various kinds of work.

Moline Automobile Company

SHOP ORDER

For

No.

Date 190 Departments

Date Completed 190 Signed

Foreman

Form R9-11-07-3M

QUANTITY TO MAKE	DESCRIPTION	DEPARTMENTS	DATE COMPLETED
	An order on this form is made for all work, copies being sent to each dept. through which the work must pass. One copy is retained by the Supt.'s office and one goes to the cost keeping dept. which		
	Defective makes out the cost		
	Spoiled record form, giving it the shop number.		

Approved

REQUISITION

Moline Automobile Company

Date____________________190____

STOCKKEEPER: Please furnish____Dept.

with material as stated below.

Signed________________________________

FORM R-7*

rm of requisition
hich must be
sed to get
aterial from
tock Room.

QUANTITY	DESCRIPTION	FOR ORDER No.	PRICE	PER	AMOUNT

Entered on Stock Record by________________________ On Cost Record by________________________

Received the above in good order______________________________________Foreman

REQUEST FOR PURCHASE

MOLINE AUTOMOBILE CO.
PURCHASING DEPT.

DATE ______________________ 190___

PLEASE ORDER FOR ______________________ DEPARTMENT

MATERIAL AND SUPPLIES AS FOLLOWS:

FORM A-4

QUANTITY	DESCRIPTION	PRICE	PER
	Used by Superintendent for all material and Supplies wanted. It is simply an order by the shop to the purchasing department.		
	O. K. SUPT.		

Signed ______________________

ORDER

MOLINE AUTOMOBILE COMPANY
Incorporated

No. 3056
Use This Number On All Letters And Invoices

EAST MOLINE, ILL.,

To

Dear Sirs: Please enter our order and ship via

to for our account, the following goods as described below, under the following conditions:

1. Please acknowledge receipt of this order and specify a certain time when it will be shipped.
2. The right is reserved to cancel this order if not filled within a reasonable time.
3. This order must not be filled at higher prices than last quoted or charged without advice.
4. Obtain lowest possible freight rate and name in bill of lading.
5. Mail invoice at the time of shipping and monthly statement on the first of each month.
6. Mark the number of this order on your invoice or it will be returned.

Quantity	
	In triplicate for everything bought by the Company. Original goes to the purchasee, second sheet for our files, third sheet for Superintendent's office. As many sheets can be used as parties that should have the information. The figures at the top of the second or office copy are used for following up orders by keeping a little steel tab on the date to be followed.

MOLINE AUTOMOBILE COMPANY

By

5 10 15 20 25 30

29.

MOLINE AUTOMOBILE COMPANY
Incorporated

No. 3056
Use This Number On All Letters
And Invoices

EAST MOLINE, ILL.,

To

Dear Sirs: Please enter our order and ship via

to for our account, the following goods as described below, under the following conditions:

1. Please acknowledge receipt of this order and specify a certain time when it will be shipped.
2. The right is reserved to cancel this order if not filled within a reasonable time.
3. This order must not be filled at higher prices than last quoted or charged without advice.
4. Obtain lowest possible freight rate and name in bill of lading.
5. Mail invoice at the time of shipping and monthly statement on the first of each month.
6. Mark the number of this order on your invoice or it will be returned.

Quantity	

MOLINE AUTOMOBILE COMPANY

By

3056

A-5

RECEIVING REPORT

NO. 31

Received Via			Received From		
Where Stored	Freight $	Express $	Town	State	
Unpacked By	Goods Checked By	Date Received	Date of Invoice	Purchase Order No.	Invoice No.

Quantity Received	ARTICLE	Size, Weight or Feet
	Made out for every shipment received. This is made in book form, two copies, that is original and a tissue copy, which is kept in the stock room.	

If Carload, State When Set and Unloaded

MOLINE AUTOMOBILE CO. STOCK RECORD

Sheet No.

Article

No.

Unit of Measure

Size or Kind

Stock Limit

Freight Cost

Per

Symbol

FORM A8

DATE	CHARGES							DISBURSEMENTS							
Received	Received From	Order No.	Quantity	Cost	Date	Order No.	Used	On Hand	Date	Order No.	Used	On Hand	Date	Order No.	Used	On Hand

a absolute record
stock is copied
this form by
osting all
ceipts and
isbursements;
therwise the
rm is self-explana-
ry.

Voucher No. *33a.*

OFFICE OF

MOLINE AUTOMOBILE CO.

(INCORPORATED)

MANUFACTURERS OF

The Moline Automobile

East Moline, Illinois, ... 190....

To ....

....

We enclose herewith .... Exchange, our Check No. .... in settlement of your account as below:

DATE	MEMORANDUM	AMOUNT INVOICE	DEDUCTIONS FREIGHT	DISCOUNT	NET AMOUNT	TOTAL

Made in triplicate, original to be returned for our file, one copy attached to invoices paid.

Please date, sign and return to
Moline Automobile Co.
EAST MOLINE, ILLINOIS

Received of MOLINE AUTOMOBILE CO. .... 190....

.... DOLLARS,

in full of above account.

....

Moli

Th

We

Voucher No. 326

OFFICE OF

Moline Automobile Co.

(INCORPORATED)

MANUFACTURERS OF

The Moline Automobile

East Moline, Illinois,..................................*190*........

To..

....

We enclose herewith....................*Exchange, our Check No.*....................*in settlement of your account as below:*

DATE	DATE	MEMORANDUM	AMOUNT INVOICE	DEDUCTIONS		NET AMOUNT	TOTAL
				FREIGHT	DISCOUNT		

Voucher No. 33 c.

OFFICE OF

MOLINE AUTOMOBILE CO.

(INCORPORATED)

MANUFACTURERS OF

The Moline Automobile

East Moline, Illinois, ... 190....

To ....

....

We enclose herewith .... *Exchange, our Check No.* .... *in settlement of your account as below:*

DATE	MEMORANDUM	AMOUNT INVOICE	DEDUCTIONS		NET AMOUNT	TOTAL
			FREIGHT	DISCOUNT		

34

CASH VOUCHER

NO. 692

Moline Automobile Co.

DATE ______________ 190__

Disbursements from Office Fund must be evidenced on this Voucher and signed by the person receiving the money.

FORM A-25

DESCRIPTION	Charge Acct. No.	Detail	Total
Self-explanatory			

Approved by ______________

Received Payment ______________

Moline Automobile Company

Dept. A—Machine

Machine No.

* TIME CARD

No. Name

Date

OPERATION	Order Number	Symbol or Name	No. Pieces Finished	Day Work		Piece Work		Rate Piece Work	Rate Day Work	Amount Piece Work	Amount Day Work
				Hours	Minutes	Hours	Minutes				
Time card											
in different											
colors to avoid											
mistakes in											
keeping depart-											
ments separate											
		Totals									

No time paid for unless accounted for on time card.
When an operation on any job is done, put number of pieces in column "Finished."
If information is needed to fill out card, get it of foreman.
Cards must be filled out and handed in before leaving at night.

Foreman's O.K. ....

Net Total Earned . .

Moline Automobile Company

* TIME CARD

Date

No. Name

Machine No.

OPERATION	Order Number	Symbol or Name	No. Pieces Finished	Day Work		Piece Work		Rate Piece Work	Rate Day Work	Amount Piece Work	Amount Day Work
				Hours	Minutes	Hours	Minutes				
		Totals									

No time paid for unless accounted for on time card.
When an operation on any job is done, put number of pieces in column "Finished."
If information is needed to fill out card, get it of foreman.
Cards must be filled out and handed in before leaving at night.

Foreman's O.K.

Net Total Earned . .

Moline Automobile Company

Dept. C—Woodworking

* TIME CARD

No. Name

Date

Machine No.

OPERATION	Order Number	Symbol or Name	No. Pieces Finished	Day Work		Piece Work		Rate Piece Work	Rate Day Work	Amount Piece Work	Amount Day Work
				Hours	Minutes	Hours	Minutes				
		Totals									

No time paid for unless accounted for on time card.
When an operation on any job is done, put number of pieces in column "Finished."
If information is needed to fill out card, get it of foreman.
Cards must be filled out and handed in before leaving at night.

Foreman's O. K.

Net Total Earned . .

Moline Automobile Company

Dept. D—Trimming

Machine No.

* TIME CARD

No. Name

Date

OPERATION	Order Number	Symbol or Name	No. Pieces Finished	Day Work		Piece Work		Rate Piece Work	Rate Day Work	Amount Piece Work	Amount Day Work
				Hours	Minutes	Hours	Minutes				
		Totals									

No time paid for unless accounted for on time card.
When an operation on any job is done, put number of pieces in column "Finished."
If information is needed to fill out card, get it of foreman.
Cards must be filled out and handed in before leaving at night.

Foreman's O.K. ……………………

Net Total Earned . .

Moline Automobile Company

Dept. E—Assembling

* TIME CARD

No. Name

Date

Machine No.

OPERATION	Order Number	Symbol or Name	No. Pieces Finished	Day Work		Piece Work		Rate Piece Work	Rate Day Work	Amount Piece Work	Amount Day Work
				Hours	Minutes	Hours	Minutes				
		Totals									

No time paid for unless accounted for on time card.
When an operation on any job is done, put number of pieces in column "Finished."
If information is needed to fill out card, get it of foreman.
Cards must be filled out and handed in before leaving at night.

Foreman's O.K. ....

Net Total Earned . .

Moline Automobile Company

Dept. G—Testing

Machine No.

* TIME CARD

No. Name

Date

OPERATION	Order Number	Symbol or Name	No. Pieces Finished	Day Work		Piece Work		Rate Piece Work	Rate Day Work	Amount Piece Work		Amount Day Work	
				Hours	Minutes	Hours	Minutes						
		Totals											

No time paid for unless accounted for on time card.
When an operation on any job is done, put number of pieces in column "Finished."
If information is needed to fill out card, get it of foreman.
Cards must be filled out and handed in before leaving at night.

Foreman's O.K. ____________________

Net Total Earned . . ____

FORM R-26

Self-explanatory

Moline Automobile Company

CASHIER :

Pay

on our next regular pay day, being in full of

as follows :

Time @ per

amounting to checks chai

Received of the Moline Automobile Co

Timekeeper :

Change wage rate for

from to beginning with

Remarks :

Approved by

FORM R-26

Self explanatory

TIME AND RATE VOUCHER

Moline Automobile Company

East Moline, Illinois, 190

CASHIER:

Pay Clock No. Amount $,

on our next regular pay day, being in full of time up to 190 inclusive,

as follows:

Time @ per amount earned less deductions for

amounting to checks charged checks returned Tools Charged

Signed Timekeeper

Received of the MOLINE AUTOMOBILE COMPANY the above amount in full payment of all demands.

Signed Employee

Timekeeper:

Change wage rate for Clock No.

from to beginning with 190

Remarks:

Signed

Approved by Foreman

MC

AC

W

RE

W

UI

W

RE

DA

FOR
BAK

Self-explanatory.

42.

Self-explanatory.

MOLINE AUTOMOBILE CO.
EAST MOLINE, ILL.

EMPLOYMENT RECORD

NAME

CLOCK NO.

ADDRESS

DEPT.

AGE

NATIONALITY

MARRIED OR SINGLE

WHERE LAST EMPLOYED

HOW LONG

REASONS FOR CHANGE

WHAT TRADE

HOW LONG WORKED AT IT

UNION MEMBER

WHAT UNION

WAGES ASKED

WAGES OFFERED

REFERENCES

DATE EMPLOYED 190

DATE LEFT 190

FORM A13
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO NEW YORK

ANY CHANGES MUST BE DESCRIBED BELOW

DATE	DESCRIPTION	FROM	TO

43.

Transportation Company's Receipt in Good Order Constitutes Delivery at Which Time Our Responsibility Ceases
All Agreements Contingent Upon Strikes, Accidents or Other Causes Beyond Our Control.

Invoice No.

Moline

Moline Automobile Company

INCORPORATED

East Moline, Illinois

Your Order of

Our Order

Initial

Car No.

SOLD TO

Shipped via

Terms

Made in triplicate, original to the purchaser, one copy to the bookkeeping department and one to the sales department

Transportation Company's Receipt in Good Order Constitutes Delivery at Which Time Our Responsibility Ceases.
All Agreements Contingent Upon Strikes, Accidents or Other Causes Beyond Our Control.

Invoice No. 436.

Moline

Moline Automobile Company

INCORPORATED

East Moline, Illinois

Your Order of

Our Order

Initial

Car No.

SOLD TO

Shipped via

Terms

44.

MOLINE AUTOMOBILE CO.

OFFICE ORDER
No. 5087

EAST MOLINE, ILL.,

Sold to

of

Route

Yours of

Initial

Car No.

Date Shipped

Terms

When to Ship

Quantity	Model	Machine No.	DESCRIPTION	PRICE	EXTENSION
			In triplicate, original to the office, second for the shop, to be returned to the office for invoicing after shipment is made, third to be retained by the shop office for their file.		

486.

MOLINE AUTOMOBILE CO.

SHIPPING ORDER

No. 5087

EAST MOLINE, ILL.,

Sold to

of

Route

Yours of

Initial

Car No.

Date Shipped

Terms

When to Ship

Quantity	Model	Machine No.	DESCRIPTION	PRICE	EXTENSION

SHIPPING CLERK

5087 49.c.

BAKER-VAWTER CO., MANUFACTURERS CHICAGO NEW YORK

____________________ R. R. Co.

ORIGINAL East Moline, Ill.________________190

Received from MOLINE AUTOMOBILE CO.

In apparent good order, the articles named below, to be delivered in like good order. without unnecessary delay.

to ____________________

at ____________________

Marks ____________________

As per Conditions of Company's Bill of Lading.

NO.	DESCRIPTION OF PACKAGES	WEIGHT Subject to Correction	RATE of Freight per 100 lbs.
	Automobiles-Set Up		
	Automobiles-Crated		
	Crate		
	Box		
	B/L made out in		
	triplicate. Used for		
	all shipments, freight,		
	express, messenger, etc		

____________________Agent

____________________Agent

MOLINE AUTOMOBILE CO., Shippers

BAKER-VAWTER CO., MANUFACTURERS, CHICAGO. NEW YORK

______________________________ R. R. Co.

DUPLICATE East Moline, Ill.________________190

Received from MOLINE AUTOMOBILE CO.

In apparent good order, the articles named below, to be delivered in like good order, without unnecessary delay,

to ______________________________

at ______________________________

Marks ______________________________

As per Conditions of Company's Bill of Lading.

NO.	DESCRIPTION OF PACKAGES	WEIGHT Subject to Correction.	RATE of Freight per 100 lbs.
	Automobiles-Set Up		
	Automobiles-Crated		
	Crate		
	Box		

______________________________Agent

MOLINE AUTOMOBILE CO., Shippers

BAKER-VAWTER CO., MANUFACTURERS, CHICAGO. NEW YORK

________________________________ R. R. Co.

SHIPPING ORDER East Moline, Ill.________________190

Delivered by MOLINE AUTOMOBILE CO.

In apparent good order, the articles named below, to be delivered in like good order, without unnecessary delay.

to ________________________________

at ________________________________

____

Marks ________________________________

As per Conditions of Company's Bill of Lading.

NO.	DESCRIPTION OF PACKAGES	WEIGHT Subject to Correction.	RATE of Freight per 100 lbs.
	Automobiles-Set Up		
	Automobiles-Crated		
	Crate		
	Box		

RAILROAD AGENT TAKE THIS

MOLINE AUTOMOBILE CO., Shippers

Debit Memorandum

No. 57.

Moline Automobile Co.
Manufacturers

East Moline, Illinois,

To

We charge your account as follows:

Address

FORM A-27 DESAULNIERS PTR MOLINE, ILL

Quantity	Description	Price	Extension	Amount
	Self explanatory.			

Moline Aut
Manuf

We charge your

FORM A-27 DESAULNIERS PTR MOLINE, ILL

Quantity

Debit Memorandum

No. 52.

Moline Automobile Co.
Manufacturers

East Moline, Illinois,

To

We charge your account as follows:

Address

FORM A-27 DESAULNIERS PTR MOLINE ILL

Quantity	Description	Price	Extension	Amount

STATEMENT

MOLINE AUTOMOBILE COMPANY

MANUFACTURERS

EAST MOLINE, ILL.

In Account
with

BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

DATE	DESCRIPTION	CHARGES	CREDITS	BALANCE

Made out in Duplicate second to be kept filed alphabetically in office.

476.

DATE STARTED

DATE FINISHED

FORM A 11 11-07 2M D

DEPT.		
DATE	LABOR	MATERI

Cost Record on which is entered the actual labor as charged to this order number from the daily time-cards and requisitions, the reverse side being a summary with the percentage added for non-productive, supplies, and general expense percentage.

SUMMARY OF LABOR AND MATERIA

FORM A 11 11-07 2M-D

DESCRIPTION	COST S
Machine Shop Productive	Dept. A
Add % Non-Prod. and Supplies	
Add Material Used	
Paint Shop Productive	Dept. B
Add % Non-Prod. and Supplies	
Add Material Used	
Wood Shop Productive	Dept. C
Add % Non-Prod. and Supplies	
Add Material Used	
Trimming Dept. Productive	Dept. D
Add % Non-Prod. and Supplies	
Add Material Used	
Assembling Dept. Productive	Dept. E
Add % Non-Prod. and Supplies	
Add Material Used	
Testing Dept. Productive	Dept. G
Add % Non-Prod. and Supplies	
Add Material Used	
A General Expense of %	
Added to each department's productive labor	

MOLINE AUTOMOBILE CO.

COST RECORD

DATE STARTED 190

ARTICLE

ORDER NO.

DATE FINISHED 190

SIZE OR KIND

QUANTITY

FORM A 11 11 07 2M O

OPERATION

DEPT.			DEPT.			DEPT.			DEPT.			DEPT.		
DATE	LABOR	MATERIAL	DATE	LABOR	MATERIAL	DATE	LABOR	MATERIAL	DATE	LABOR	MATERIAL	DATE	LABOR	MATERIAL

Cost Record on which is entered the actual labor as charged to this order number from the daily time cards and requisitions, the reverse side being a summary with the percentage added for non-productive, supplies, and general expense percentage.

48.

MOLINE AUTOMOBILE CO.

SUMMARY OF LABOR AND MATERIAL COSTS ON ORDER NO.

FORM 411 11-07 2M-D

COST SUMMARY					CREDITS	
DESCRIPTION		DETAIL	DEPT. COST	TOTAL SHOP COST	DESCRIPTION	AMOUNT
Machine Shop Productive	Dept. A					
Add % Non-Prod. and Supplies						
Add Material Used						
Paint Shop Productive	Dept. B					
Add % Non-Prod. and Supplies						
Add Material Used						
Wood Shop Productive	Dept. C					
Add % Non-Prod. and Supplies						
Add Material Used						
Trimming Dept. Productive	Dept. D					
Add % Non-Prod. and Supplies						
Add Material Used						
Assembling Dept. Productive	Dept. E					
Add % Non-Prod. and Supplies						
Add Material Used						
Testing Dept. Productive	Dept. G					
Add % Non-Prod. and Supplies						
Add Material Used						
A General Expense of %						
Added to each department's productive labor						

LINE AUTOMOBILE CO.

L COSTS ON ORDER NO.

MMARY			CREDITS	
DETAIL	DEPT. COST	TOTAL SHOP COST	DESCRIPTION	AMOUNT

PRODUCT________________

MOLINE AUTOMOBIL

RECAPITULATION OF SALE AND COST PRICE FOR PERIOD OF

FORM A 29
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

DATE	NO.	SALE	COST	DATE	NO.	SALE

Form use
ing of m
all good
in order
total sa
costs on
the mon
charged
proper a

MOLINE AUTOMOBILE CO.

PRODUCT________________

RECAPITULATION OF SALE AND COST PRICE FOR PERIOD OF

FORM A 29
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

	DATE	NO.	SALE	COST	DATE	NO.	SALE	COST	DATE	NO.	SALE	COST
Form used for itemizing of invoices on all goods shipped in order to get the total sales and costs on same for the month, to be charged to their proper accounts												

MOLINE AUTOMOBILE CO.

PRODUCT

RECAPITULATION OF SALE AND COST PRICE FOR PERIOD OF

FORM [illegible]
[illegible] MANUFACTURERS [illegible] NEW YORK

DATE	NO.	SALE	COST	DATE	NO.	SALE	COST	DATE	NO.	SALE	COST

COST	DATE	NO.	SALE	COST	

Self-explan

MOLINE AUTOMOBILE CO.

STATEMENT OF MANUFACTURING ACCOUNTS FOR PERIOD OF MONTHS ENDING 190

Self explanatory

No.	ACCOUNT NAME		TO DATE				CURRENT MONTH				
		[illegible]	THIS YEAR	LAST YEAR	DIFFERENCE		Per [illegible]	THIS YEAR	LAST YEAR	DIFFERENCE	
	MANUFACTURING ACCOUNTS										
100	Material Used Machine Dept. A										
101	Material Used Painting Dept. B										
102	Material Used Wood Working Dept. C										
103	Material Used Finishing Dept. D										
104	Material Used Assembling Dept. E										
105											
106											
	PRODUCTIVE LABOR										
107	Machine Dept. A										
108	Painting Dept. B										
109	Wood Working Dept. C										
110	Finishing Dept. D										
111	Assembling Dept. E										
112											
113											
	NON-PRODUCTIVE LABOR AND SUPPLIES										
114	Machine Dept. A										
115	Painting Dept. B										
116	Wood Working Dept. C										
117	Finishing Dept. D										
118	Assembling Dept. E										
119											
120											
	GENERAL EXPENSE										
121	[illegible]										
122	[illegible]										
123	Experimental										
124	[illegible]										
125	Heat, Light and Power										
126	Insurance										
127	Miscellaneous										
128	Repairs on Machinery and Tools										
129	Repairs on Buildings										
130	Printing and Stationery										
131	Salaries										
132	Taxes										
133											
134											
135											
136											
137											
	TOTAL										

MOLINE AUTO

51.

STATEMENT OF REVENUES AND EXPENSES FOR PERIOD OF

FORM A2
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

Self-explana

Acct. No.	ACCOUNT NAME	TO DAT	
		THIS YEAR	LAST YEAR
	REVENUES		
62	Automobile Sales		
63	Repair Sales		
64	Jobbing Sales		
65			
66			
67			
	GAINS		
68	Discount Earned		
69	Interest Earned		
70	Junk Sales		
71			
72			
	TOTAL REVENUES		
	EXPENSES		
	ADMINISTRATIVE EXPENSE		
73	Advertising		
74	Collection and Exchange		
75	Commission		
76	Interest		
77	Legal Expense		
78	Miscellaneous		
79	Postage		
80	Salaries		
81	Telegrams and Telephone		
82	Travelling Expense		
83			
84			
85			
	COST OF GOODS SHIPPED		
86	Automobiles		
87	Repairs		
88	Jobbing		
89			
90			
91			
	LOSS ACCOUNTS		
92	Discount Allowed		
93	Rebates and Allowances		
94	Estimated Losses		
95			
	TOTAL EXPENSES		

MOLINE AUTOMOBILE CO

STATEMENT OF ASSETS AND LIABILITIES

190

FORM A2
BAKER VAWTER CO. MANUFACTURERS, CHICAGO NEW YORK

Self-explanatory

Acct. No.	ACCOUNT NAME	DETAIL	TOTAL
	ASSETS		
	CASH ACCOUNTS		
1	Office Fund		
2	Bank		
3	Bank		
4	Bank		
5			
	BOOK ACCOUNTS		
6	Accounts Receivable		
7	Notes Receivable		
8			
9			
10			
	Personal Accounts		
	INVENTORY ACCOUNTS		
11	Material and Supplies		
12	Manufacturing		
13	Lumber		
14			
15			
	PLANT ACCOUNTS		
16	Real Estate		
17	Buildings		
18	Machinery and Tools		
19	Office Furniture		
20	Patterns		
21	Drawings		
22	Advertising Equipment		
23			
24			
25			
	BETTERMENTS		
26	Real Estate		
27	Buildings		
28	Machinery and Tools		
29	Office Furniture		
30	Patterns		
31	Drawings		
32	Advertising Equipment		
33			
34			
35			
	Assets Forward		

Acct. No.	ACCOUNT NAME	DETAIL	TOTAL
	Assets Forwarded		
	MISCELLANEOUS ASSETS		
37	Advanced Insurance		
38	Advanced Interest		
39	Advanced Advertising		
40	Patents		
41	Treasury Stock		
42			
43			
44			
45			
	Total Assets		
	LIABILITIES		
	CAPITAL ACCOUNTS		
46	Capital Stock		
47	Surplus		
48	Loss and Gain		
49	Reserve for Depreciation		
50	Reserve for Losses		
51			
52			
53			
	OUTSIDE LIABILITIES		
54	Accounts Payable		
55	Notes Payable		
56	Accrued Taxes		
57	Accrued Interest		
58	Accrued Labor		
59			
60			
61			
	Personal Accounts		
	Total Liabilities		
	RECAPITULATION		
	Assets Dr.		
	Liabilities Cr.		
	Expense Dr.		
	Revenues Cr.		
	Trial Balance		

MOLINE AUTOMOBILE CO.

51.

STATEMENT OF REVENUES AND EXPENSES FOR PERIOD OF MONTHS ENDING 190

[illegible]

Acct. No.	ACCOUNT NAME	TO DATE				CURRENT MONTH			
		THIS YEAR	LAST YEAR	DIFFERENCE	%	THIS YEAR	LAST YEAR	DIFFERENCE	%
	REVENUES								
62	Automobile Sales								
63	Repair Sales								
64	Jobbing Sales								
65									
66									
67									
	GAINS								
68	Discount Earned								
69	Interest Earned								
70	Junk Sales								
71									
72									
	TOTAL REVENUES								
	EXPENSES								
	ADMINISTRATIVE EXPENSE								
73	Advertising								
74	Collection and Exchange								
75	Commission								
76	Interest								
77	Legal Expense								
78	Miscellaneous								
79	Postage								
80	Salaries								
81	Telegrams and Telephone								
82	Travelling Expense								
83									
84									
85									
	COST OF GOODS SHIPPED								
86	Automobiles								
87	Repairs								
88	Jobbing								
89									
90									
91									
	LOSS ACCOUNTS								
92	Discount Allowed								
93	Rebates and Allowances								
94	Estimated Losses								
95									
	TOTAL EXPENSES								

OBILE CO.

MONTHS ENDING 190

		CURRENT MONTH			
DIFFERENCE	%	THIS YEAR	LAST YEAR	DIFFERENCE	%

52.

JOURNAL MEMORANDUM

NO.

MOLINE AUTOMOBILE CO. EAST MOLINE, ILL. 190

BOOKKEEPER: ENTER THE FOLLOWING: AUTHORITY

FORM A28
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

Self-explanatory.

CHARGE

TOTAL

CREDIT

TOTAL

SHEET NO.

MOLINE AUTO

53.

JOURNAL ENTRIES FOR THE MONTH OF

FORM A17
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

DAY	DESCRIPTION OF ENTRY	Acct. No.	GENERAL L CHARGES

lf-explanat

MOLINE AUTOMOBILE CO

SHEET NO

JOURNAL ENTRIES FOR THE MONTH OF 190

FORM A 17
BAKER-VAWTER CO. MANUFACTURERS CHICAGO NEW YORK

elf explanatory

DAY	DESCRIPTION OF ENTRY	GENERAL LEDGER				ACCOUNTS RECEIVABLE			ACCOUNTS PAYABLE		
		Acct. No.	CHARGES	✓	CREDITS	CHARGES	✓	CREDITS	CHARGES	✓	CREDITS

Pay-Roll For Period Ending 190

FORM A10 600-6-07

Clock No.	NAME

This is self-explanatory.
We pay every ten
day; the 4th - 14th
and 24th.

54. MOLINE AUTOMOBILE CO.

Sheet No. 61

Pay-Roll For Period Ending 190

FORM A10 500-8-07

Clock No.	NAME	Total Time	Rate	Amount Earned	Deducted	Amount Paid	REMARKS

This is self explanatory.
We pay every tenth
day; the 4th 14th
and 24th

SHEET NO.__________ MOLINE AUTOMOBILE CO. ACCOUNT NO.__________

ACCOUNT NAME

FORM A21
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899.

DATE	CHARGES				DATE	CREDITS			
190	DESCRIPTION	POSTING REF.	√	AMOUNT	190	DESCRIPTION	POSTING REF.	√	AMOUNT

dger Sheet.

ACCOUNT NO.________ 62.

ACCOUNT NAME 55.

MOLINE AUTOMOBILE CO.

SHEET NO.________

FORM A21
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899.

CHARGES					CREDITS				
DATE 190	DESCRIPTION	POSTING REF.	√	AMOUNT	DATE 190	DESCRIPTION	POSTING REF.	√	AMOUNT

56.

explan

MOLINE AUTOMOBILE CO.

IN ACCOUNT WITH BANK FOR THE MONTH OF 190

FORM A 16
BAKER-VAWTER CO. MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899

xplanator

DAY	DESCRIPTION	DAILY STATEMENT						OUTSTANDING CHECKS							
		DEPOSITS	√	CHECKS	√	BALANCE	√	NO.	√	AMOUNT	√	NO.	√	AMOUNT	√
	Balance Forwarded														
	Our Balance														
	Outstanding Checks														
	Bank Balance														

SHEET NO. __________

MOLINE AUT

RECORD OF APPROVED INVOICES TAKEN INTO ACCOUNT FOR

57.

FORM A18
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO. NEW YORK

INVOICE		DAY ENT.	NAME
NO.	DATE		
			Forwarded
			Forward

elf-explan

MOLINE AUTOMOBILE CO.

SHEET NO. ________

RECORD OF APPROVED INVOICES TAKEN INTO ACCOUNT FOR THE MONTH OF 190

FORM A 18
BAKER VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

PATENTED MAY 11, 1896

Self explanatory

INVOICE		DAY ENT.	NAME	ACCOUNTS AFFECTED	√	CREDIT ACCOUNTS PAYABLE	DATE PAID	CHARGE MISCELLANEOUS			
NO.	DATE							DESCRIPTION	ACCT. NO.	√	AMOUNT
			Forwarded								
			Forward								

SHEET NO.____________

MOLINE AUTO

RECORD OF COLLECTIONS FOR THE MONTH OF

58.

FORM A 14
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

Self-explana

DAY	NAME	√	CREDIT ACCOUNTS RECEIVABLE
	Forwarded		
	Forward		

SHEET NO.__________

RECORD OF COLLECTIONS FOR THE MONTH OF 190

FORM A 14
BAKER-VAWTER CO. MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899

DAY	NAME	√	CREDIT ACCOUNTS RECEIVABLE	CHARGE DISCOUNT	CHARGE MISCELLANEOUS			CREDIT GENERAL LEDGER			CHARGE BANK	
					Acct. No.	√	AMOUNT	Acct. No.	√	AMOUNT	AMOUNT RECEIVED	DAILY TOTAL
	Forwarded											
	Forward											

[illegible] story

MOLINE AUTOMOBILE CO.

SHEET NO.________

Record of Office Fund Disbursements for the Month of ________ *190*

FORM A 22
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899

elf-explanatory.

DAY	PAID TO	VOUCHER NO.	ACCOUNT OF	ACCT. NO.	\	AMOUNT PAID
	Forwarded					
	Forward					

SHEET NO. ____________

MOLINE AUTOMOBILE CO.

Record of Office Fund Disbursements for the Month of 190

59.

FORM A 22
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899

DAY	PAID TO		VOUCHER NO.	ACCOUNT OF	ACCT. NO.	√	AMOUNT PAID
		Forwarded					
		Forward					

SHEET NO.__________

MOLINE AUTO

RECORD OF CHECKS DRAWN ON

60.

FORM A 15
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

lf explana

DAY	PAYABLE TO ORDER OF	DESCRIPTION	CHA Acct. No.
		Forwarded	
		Forward	

MOLINE AUTOMOBILE CO.

SHEET NO.________

RECORD OF CHECKS DRAWN ON FOR THE MONTH OF 190

FORM A 16
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

PATENTED APRIL 11, 1899

[illegible] planatory

DAY	PAYABLE TO ORDER OF	DESCRIPTION	CHARGE GENERAL LEDGER			√	CHARGE ACCOUNTS PAYABLE	CREDIT DISCOUNT EARNED	CREDIT BANK		
			Acct. No.	√	AMOUNT				CHECK NO.	AMOUNT OF CHECK	DAILY TOTAL
		Forwarded									
		Forward									

ACCOUNT NO.________

RECAPITULATION OF

FORM A 19
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

Self-explana

NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.

SHEET NO.______ MOLINE AUTOMOBILE CO. ACCOUNT NO.______

RECAPITULATION OF FOR

FORM A 19
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO NEW YORK

[illegible] Laboratory

NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT

COMPARATIVE STATEMENT OF

62.

FORM A 20
BAKER-VAWTER CO., MANUFACTURERS, CHICAGO. NEW YORK

Self-explana

	DAY	JANUARY		FEBRUARY

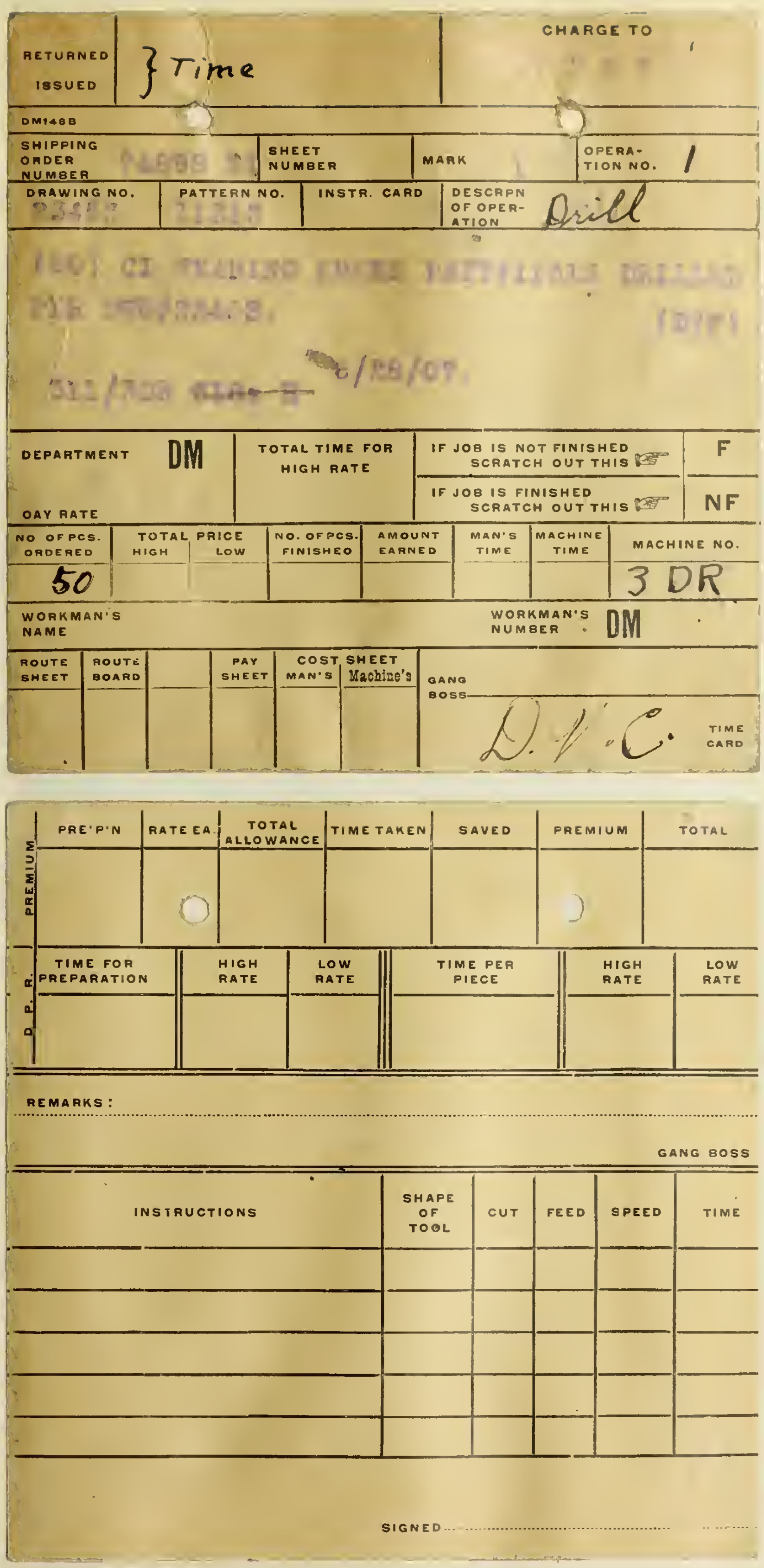
MOLINE AUTOMOBILE CO.

COMPARATIVE STATEMENT OF FOR

FORM A 20
BAKER VAWTER CO., MANUFACTURERS, CHICAGO, NEW YORK

[illegible]

DAY	JULY	√	AUGUST	√	SEPTEMBER	√	OCTOBER	√	NOVEMBER	√	DECEMBER	√	TOTAL THIS YEAR	TOTAL LAST YEAR	DIFFERENCE



RETURNED ISSUED	} Time	CHARGE TO [illegible]
DM148B		

SHIPPING ORDER NUMBER [illegible]	SHEET NUMBER	MARK	OPERATION NO. 1
DRAWING NO. [illegible]	PATTERN NO. [illegible]	INSTR. CARD	DESCRPN OF OPERATION Drill

[illegible]

[illegible] (D/F)

[illegible] /28/07.

DEPARTMENT DM DAY RATE	TOTAL TIME FOR HIGH RATE	IF JOB IS NOT FINISHED SCRATCH OUT THIS ☞	F
		IF JOB IS FINISHED SCRATCH OUT THIS ☞	NF

NO. OF PCS. ORDERED	TOTAL PRICE HIGH	TOTAL PRICE LOW	NO. OF PCS. FINISHED	AMOUNT EARNED	MAN'S TIME	MACHINE TIME	MACHINE NO.
50							3 DR

WORKMAN'S NAME

WORKMAN'S NUMBER DM

ROUTE SHEET	ROUTE BOARD		PAY SHEET	COST SHEET MAN'S	COST SHEET Machine's	GANG BOSS
						D. V. C.

TIME CARD

	PRE'P'N	RATE EA.	TOTAL ALLOWANCE	TIME TAKEN	SAVED	PREMIUM	TOTAL
PREMIUM							

	TIME FOR PREPARATION	HIGH RATE	LOW RATE	TIME PER PIECE	HIGH RATE	LOW RATE
D. P. R.						

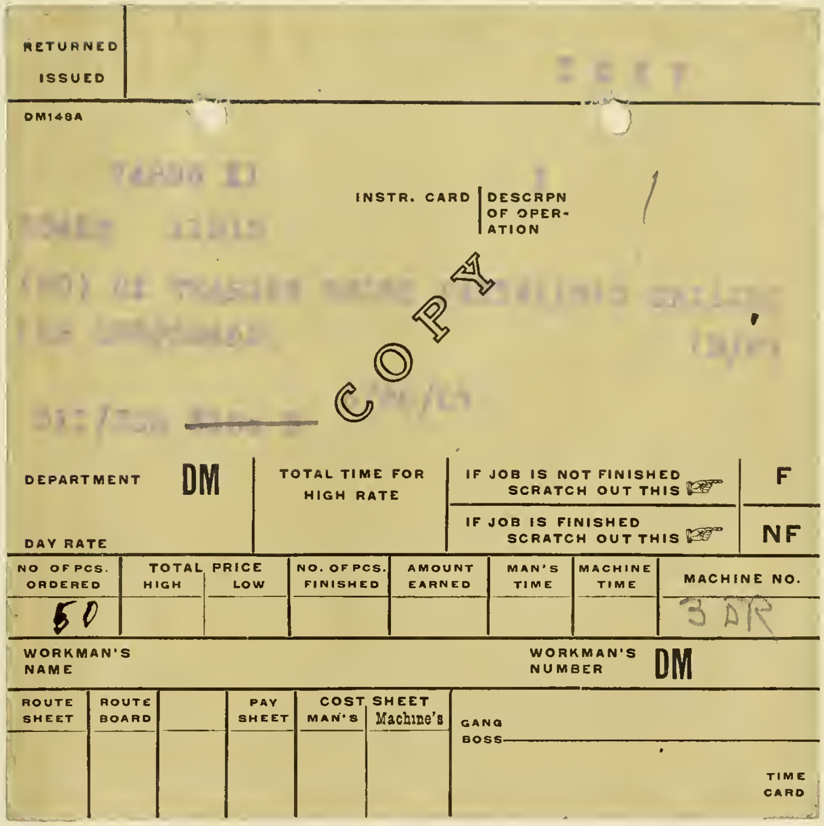
REMARKS: ....

GANG BOSS

INSTRUCTIONS	SHAPE OF TOOL	CUT	FEED	SPEED	TIME

SIGNED ....

Work Card.
Link Belt Co.



RETURNED
ISSUED

DM148A

INSTR. CARD | DESCRPN OF OPERATION

/

COPY

DEPARTMENT **DM** DAY RATE	TOTAL TIME FOR HIGH RATE	IF JOB IS NOT FINISHED SCRATCH OUT THIS ☞	F
		IF JOB IS FINISHED SCRATCH OUT THIS ☞	NF

NO OF PCS. ORDERED	TOTAL PRICE HIGH	TOTAL PRICE LOW	NO. OF PCS. FINISHED	AMOUNT EARNED	MAN'S TIME	MACHINE TIME	MACHINE NO.
50							3 DR

WORKMAN'S NAME

WORKMAN'S NUMBER **DM**

ROUTE SHEET	ROUTE BOARD		PAY SHEET	COST SHEET MAN'S	COST SHEET Machine's	GANG BOSS

TIME CARD

WORK CARD DUPLICATE.
Link Belt Co.

III. PROPOSED SYSTEM FOR THE MECHANICAL ENGINEERING SHOPS OF THE UNIVERSITY OF ILLINOIS.

The system here proposed, has for its principal object the determination of the cost of instruction in shop practice. A close detailing of the costs for each student will not be attempted but the total expenses in each course of instruction will be equally divided among the students registered. The costs of job work of the Employed Labor division will, however, be also considered in a little more detail.

The forms presented in this system are simple and theoperation will not require a large amount of clerical work. Two clerks could easily do the work for all the shops.

The Mechanical Engineering Shops consist of a Pattern Shop, a Foundry, a Forge Shop, and a Machine Shop, in which instruction is given. In the organization as shown on the chart, p.69 , there is also a division of Employed Labor which does job work for various parties and departments in the University. In the present system this is considered as, a productive department of the shops and the cost keeping is handled in much the same manner as in commercial concerns.

The work of the students in the various shops consists of exercises in the use of tools, machines and equipment and practical work in pattern making, molding, core-making, forging and machine construction. In the wood-shop the student also does some furniture construction for himself and in the machine shop he may build an engine or machine of some sort for his own use. The material for this work is paid for by the student and

does not enter the Shop Account.

The first element of this system to be considered is the Student Time Card, Form A, p.70 . This has no direct relation to the cost keeping of the shops but is, rather, a record of the student's work. It is made out and kept by the instructor in charge and is used particularly for the standard exercises which are referred to under Piece Number. A daily time record of the hours spent on the piece, a tardiness record and the number of pieces used is kept on the card used. It thus becomes a record for the comparison of various students and classes on similar work and contains valuable information for the instructor.

The next form in the system is the stock requisition, Form B, p.71 . It is made out by the student upon his assignment or work and is presented by him to the stock keeper to whom it becomes a receipt for material. The card contains the items of quantity and kind of material, its weight and cost and thus gives the necessary information to the clerk for posting the daily costs in the Shop Account.

In order that the student may properly fill out the items of weight and cost a table of these values for the various exercises should be posted in the shop for his reference.

The requisitions are to be made up on heavy manilla paper in padsof twenty-five. One of these pads will be given to each student in the shop and pencils will be kept at the tool room for the use of those who are not provided.

The stock-keeper will deposit the requisitions in a small box at the stock room. They will be collected from here

by the clerk who then transfers the charges to the Shop Account.

A page of the Shop Account book is shown in Form C, p. 72. The book is of the loose leaf type, the pages being 8 1/2 in. x 11 in. The forms will differ in the various shops only in the title, as Forge Shop Account, Foundry Account, etc.

The charges made in this book will not necessarily be itemized for each separate requisition but all the disbursements of one kind of material for the day may be lumped into a single charge, the sum of the separate issues being the total amount. Only the material used for shop instruction will be entered in this book, such issues as go to job work or material sold to the students being accounted for in the Shop Ledger.

The card shown in Form D, p. 73, is a summary of the charges for instruction for a given period of time. The items included are self-explanatory, the first being taken from the Shop Account, the second, from the monthly pay-roll and the next three being calculated. The cost of heat, light and power may be determined by estimate. Depreciation charges will be considered as ten per cent of the value of buildings and equipment per year. This is rather a high percentage but is taken thus on account of the hard use of machinesin this work. Three per cent of this should be charged to the Employed Labor division and thus the actual charge to instruction for depreciation is seven per cent per year. The last cost item is variable and is obtained from the accounts of the department. A cost summary card should be made out monthly for each shop and the total costs for a semester obtained from these. The cards may be filed in an ordinary 5 in. x 3 in. card drawer.

The Production Card, Form E/ p. 74 , comprises a complete cost card for the job that it covers. One of these is to be made out, with the exception of the cost items, by the workman for each job. They will be deposited in a box at the tool room to be collected by the clerk, who records the various items of cost and enters the total charge in the shop Ledger.

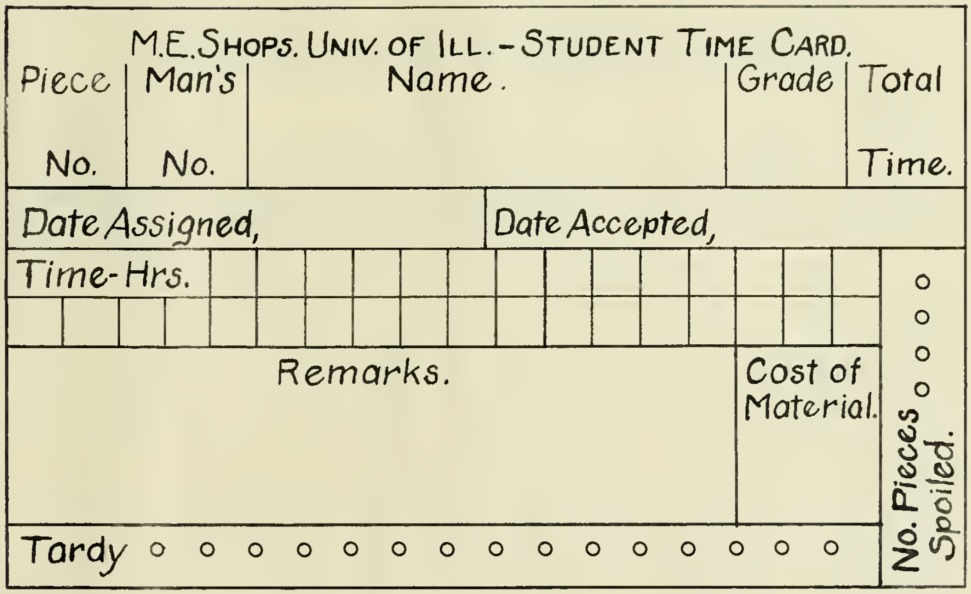
The Ledger contains the accounts of all sections of the shops. A sheet of this is shown in Form F, p. 75 . It is similar to any shop ledger and needs no explanation.

The system proposed for the Mechanical Engineering Shops is not applicable to commercial cost accounting. It is a special problem, dealing with entirely different conditions fr from those of productive concerns. Even in manufacturing the details of the systems must necessarily vary with the factory conditions and the article produced. Only the basic principle of accounting remain the same thruout.

Systems cannot be installed like a new machine and operate in the prescribed manner from the start. The successful system grows with the factory, blends with the organization and gradually becomes automatic in its action. Changes must be made and the well designed system is flexible enough to allow for these without seriously disturbing the general routine. Allowance, therefore, must always be made for expansion and the progressive changes of the factory. Good design in cost-keeping depends, as in mechanical design, on intimate knowledge of the conditions of operation and the objects sought.

- ASS'T. PROF. OF MACHINE CONSTRUCTION.
  - PATTERN SHOP.
    - Stock Room.
    - Tool Room.
    - Wood Shop.
      - Benches.
      - Lathes.
      - Saws, Planers, etc.
  - FOUNDRY.
    - Stock Room.
    - Pattern Storage.
    - Core Dep't.
    - Molding Room.
  - FORGE SHOP.
    - Stock Room.
    - Forge Room.
  - METAL SHOP.
    - Stock Room.
    - Tool Room.
    - Machine Shop.
      - Lathes.
      - Other Machines.
      - Erecting.
  - EMPLOYED LABOR.
    - Carpenters.
    - Painters.
    - Molders.
    - Smiths.
    - Machinists.
  - CLEANING.
    - Janitors.
    - Oilers.
  - OFFICE.
    - Clerks.
    - Draftsmen.

CHART OF ORGANIZATION.
M. E. SHOPS.-UNIV. OF ILL.



M.E. SHOPS. UNIV. OF ILL.—STUDENT TIME CARD.

Piece No.	Man's No.	Name.	Grade	Total Time.

Date Assigned,

Date Accepted,

Time-Hrs.

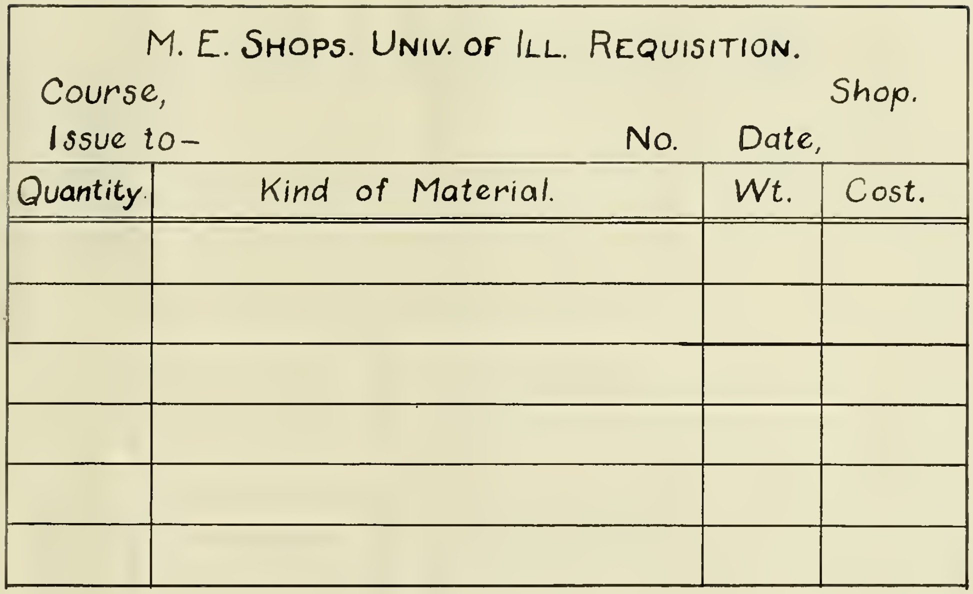
Remarks.

Cost of Material.

No. Pieces Spoiled. ○ ○ ○ ○

Tardy ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Form A.



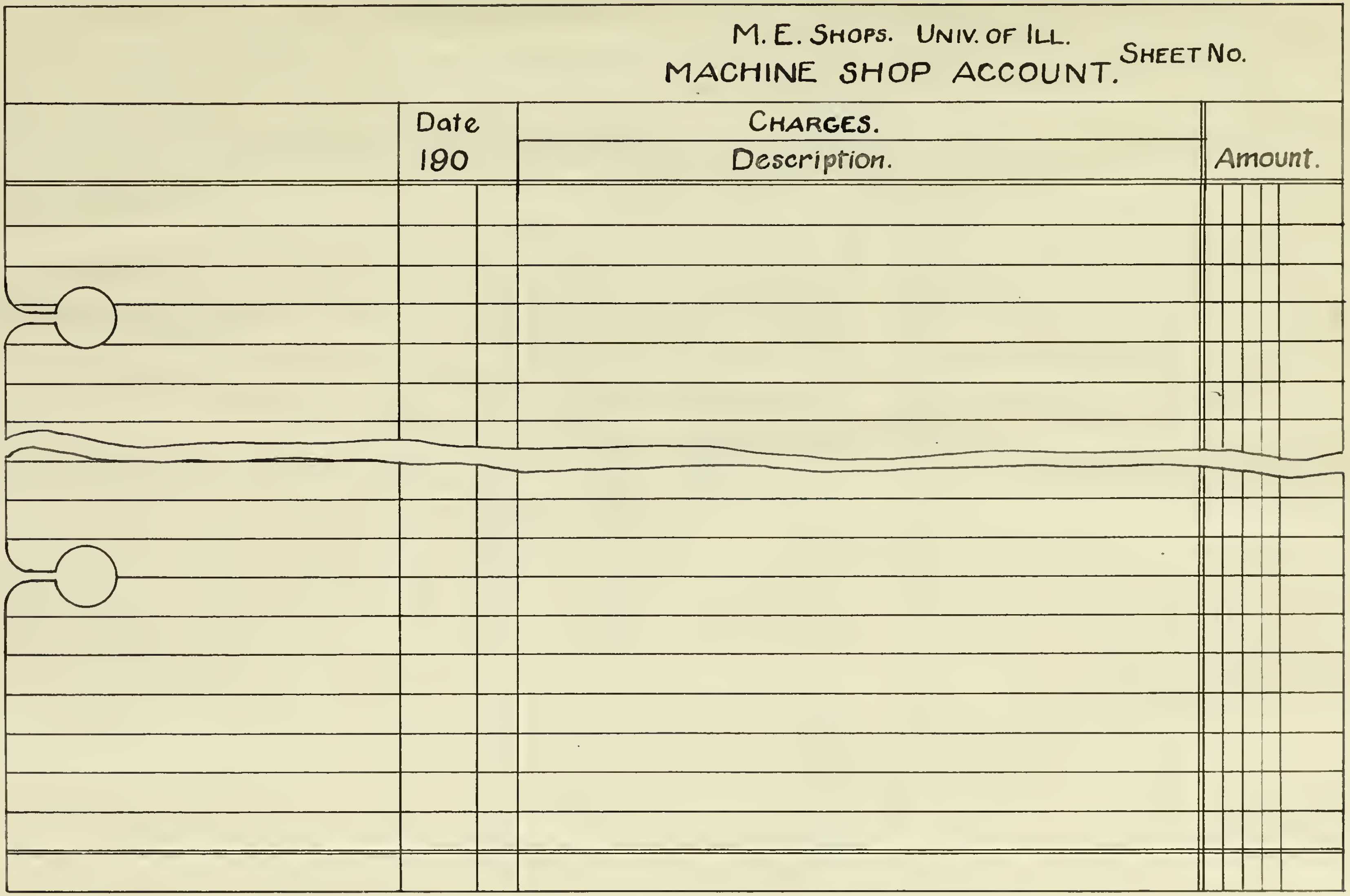
M. E. SHOPS. UNIV. OF ILL. REQUISITION.

Course, Shop.

Issue to– No. Date,

Quantity	Kind of Material.	Wt.	Cost.

Form B.



M. E. Shops. Univ. of Ill.

MACHINE SHOP ACCOUNT. Sheet No.

	Date 190	CHARGES. Description.	Amount.

Form C.

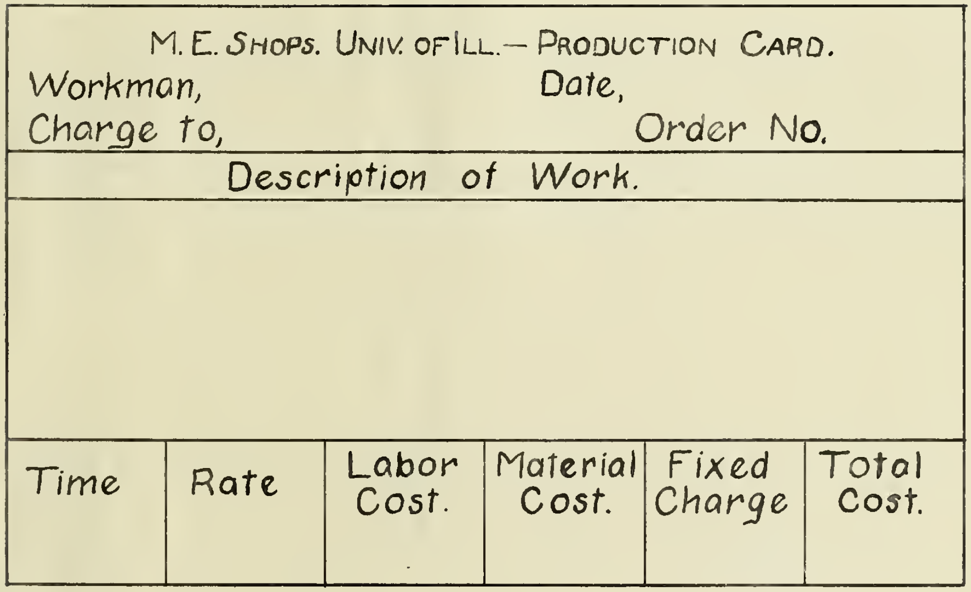
M E Shops. Univ. of Ill.-Cost Summary.

Course, Shop.

Date From, To,

Cost Item.	Amount.	
Total Material Used.		
Wages and Salaries.		
Heat, Light and Power.		
Depreciation		
Supplies and Miscellaneous Charges.		
Total Cost.		
No. of Students –		
Cost per Student.-		

Form D.



M. E. SHOPS. UNIV. OF ILL.—PRODUCTION CARD.

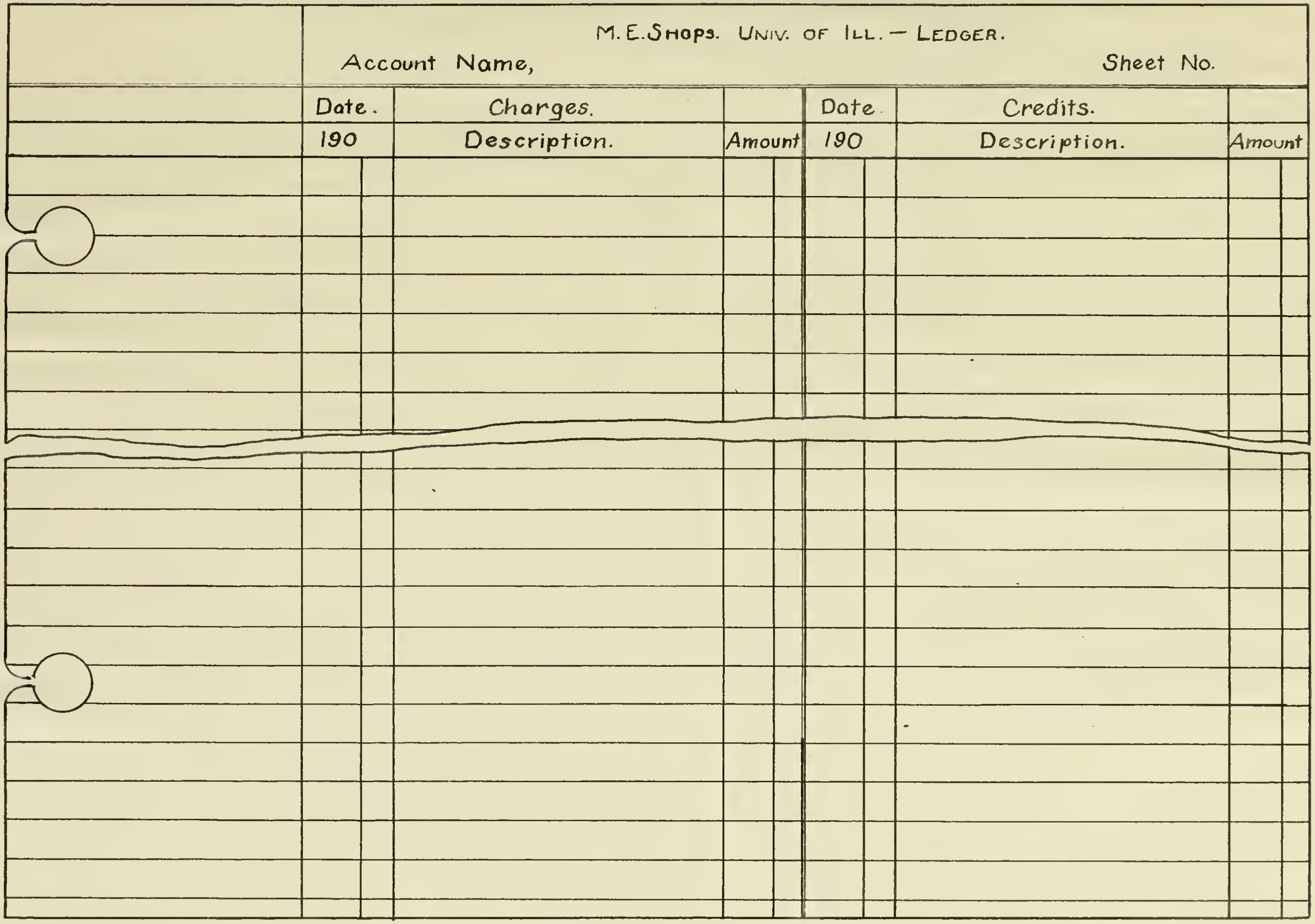
Workman, Date,

Charge to, Order No.

Description of Work.

Time	Rate	Labor Cost.	Material Cost.	Fixed Charge	Total Cost.

Form E.



M.E.Shops. Univ. of Ill. — Ledger.

Account Name, Sheet No.

	Date.	Charges.		Date.	Credits.	
	190	Description.	Amount	190	Description.	Amount

Form F.

UNIVERSITY OF ILLINOIS-URBANA
3 0112 086825566